Quantitative Study on the Awareness of Deep Vein Thrombosis among Pregnant Women and Postpartum In Jazan City, Saudi Arabia

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I. Introduction

     Venous thrombosis continues to be one of the major problems facing women, particularly pregnant and postpartum women. It is one of the leading causes of mortality, morbidity as well as high costs in the world today, Saudi Arabia in particular (Cohen et al. 2007). Today, women are at high risk four to five times more likely of developing deep vein thrombosis during pregnant and postpartum (Mclintock 2014). The condition can result in the most feared complication such as pulmonary embolism (PE) which is the leading cause of maternal death especially in pregnant and postpartum women.

     Besides, deep vein thrombosis (DVT) has been feared to result in long term complications such as post thrombotic syndrome. Because of all these factors, this study purposefully looks at assessing the awareness of deep vein thrombosis among pregnant and postpartum women. This is as important as it will help us understand and appreciate the role of awareness programs in reducing the risk of deep vein thrombosis.

Background

     Deep vein thrombosis has become one of the leading causes of mortality and maternal morbidity in the world (Osman 2018). Deep vein thrombosis if untreated can result in one of the most feared complications of pulmonary embolism that has been heavily linked to a high number of mortality cases in pregnant and postpartum women (Greer 2015).

     The Kingdom of Saudi Arabia (KSA) is one of the leading countries in the incidence and prevalence of venous thrombosis both deep vein thrombosis and pulmonary embolism. Several cases of death associated with venous thrombosis have been reported with 6% of the total cases arising from deep vein thrombosis and 12% arising from a pulmonary embolism. This is despite the ongoing good management of this condition in the country (Al-Hameed 2015).

     According to Beckman et al (2010), approximately 600, 000 people are affected by deep vein thrombosis every year within Saudi Arabia (KSA) and the United States of America (USA) recording the highest number. This is a worrying issue because DVT is a serious and critical condition that if not attended to can result in the fatal complication of the development pulmonary embolism (Osman 2018).

At altitude, thromboembolic events including both deep vein thrombosis and pulmonary embolism have been uncommon. This is according to a study conducted in the year 2016 to determine and understand the diagnostic challenges, awareness and management considerations of deep vein thrombosis and pulmonary embolism at altitude (Hull, Rajendran and Barnes 2016). Besides, the incidence and prevalence of this condition thrombosis remain uncharted among mountain athletes. However, prevention of thrombosis requires a high and strong awareness among participants as well as healthcare practitioners (Kalipatnapu et al 2019).

Several treatment options have been developed to curb the incidence and prevalence of this condition. For instance, doctors are using anticoagulation methods to help minimize pain and spread of the disease. The anticoagulation method involves the use of subcutaneous heparin, an anticlotting agent together with warfarin which is an oral anticoagulant that plays an important role in preventing clotting that may occur in arteries, vein and also in the lung (Onishi et al. 2016). The combination of heparin and warfarin helps in treating and preventing any blood clot in the blood vessels in the arteries, veins and also in the lungs (Onishi et al. 2016). Other diagnosis and treatment options for venous thromboembolism involves combining medical history and physical examination with pre-test probability models as well as D-dimer testing (Streiff et al. 2016).

The incidence and prevalence of deep vein thrombosis has been on the high rise year after year. This is worrying not only in the affected nations like Saudi Arabia and the United States of America but also to the whole world. According to the World Health Organization (WHO), the incidence of deep vein thrombosis stands at 1 per 1000 population every year. Although these statistics represent the overall statistics in the world, there is no clear reference study in the Kingdom of Saudi Arabia on the true incidence of deep vein thrombosis (Van Den Akker et al. 2016).

The risk of developing deep vein thrombosis is very high, especially in pregnant and postpartum women and therefore there is a high need for an awareness that will help in providing knowledge to both pregnant and postpartum women (Bell et al. 2016).

Damage to the endothelial vessel results in sluggish blood flow, a significant promoter of a blood clot. This, in turn, reduces blood flow in the veins thereby resulting in deep vein thrombosis (Altayeb 2019). Untreated deep vein thrombosis can induce one of the most feared complications of venous thromboembolism, which is pulmonary embolism characterized by the presence of a blood clot in the lungs (Giordanoet al. 2017). The blood clot manifests itself in the lungs as a result of deep vein thrombosis limiting the flow of blood to the lungs as a result of blockage of the pulmonary artery. Because pulmonary embolism is a fatal condition, early diagnosis and treatment is highly regarded as a life-saving measure. However, it is very challenging to achieve an early diagnosis of deep vein thrombosis because of unclear clinical manifestations of the condition among pregnant and postpartum women (Min et al. 2016).

The most common symptom associated with DVT is pain involving the lower body extremities. The pain is frequently accompanied by swelling that has been known to be one of the most common symptoms associated with deep vein thrombosis (Mazzolai et al.2018). Research has also proved that close to 80% of cases occurring during pregnancy occur in the left leg. Other symptoms linked to deep vein thrombosis are reddening of the skin, especially at the back of the leg, severe pain while bending your foot upwards, feeling of pain while standing, warm skin especially in the area affected by the disease among pregnant and postpartum women. This is because of the biological make up involving hormonal changes in women especially those who are pregnant or have given birth (Tee and Rosenfeld 2019).

A number of reports have been evaluated on the importance of preventing the risk of deep vein thrombosis among pregnant and postpartum women. This is because pregnant and postpartum women are at high risk of developing deep vein thrombosis. This high risk is heavily linked to the high mortality as well as morbidity rates which has been known to result from blood clots hindering the flow of blood from the heart to other parts of the body. However, few studies have focused on the patient's awareness of deep vein thrombosis especially in Arab countries. Because of this, the study carefully assesses the awareness of deep vein thrombosis among pregnant and postpartum women to help reduce the risk of deep vein thrombosis during pregnancy (Altayeb 2019).

Several works of literature have shown their support on various programs aiming at reducing the risk of deep vein thrombosis during pregnancy. However, little has been done regarding the awareness of deep vein thrombosis posing a significant problem to the World (Streiff et al. 2016). This poses a great danger not only to women in Saudi Arabia but also women in other parts of the country. It is because of this that this study looks at the awareness of deep vein thrombosis among pregnant and postpartum women.

Significance of the Problem

Today, women are at high risk four to five times more likely of developing deep vein thrombosis during pregnancy and postpartum (Lisonkova et al. 2017). Deep vein thrombosis is a serious condition that if left untreated or unattended can result in Pulmonary Embolism (PE) one of the most feared complications. In Saudi Arabia, one of the countries with high prevalence rates of Venous Thromboembolism (VTE), several death

cases are reported annually as a result of this disease. Approximately 6% of the death cases reported is as a result of deep vein thrombosis and 12% of the cases arising from pulmonary embolism (AL-Hameed 2015). Because of these overwhelming statistics, there is a need to understand and appreciate the awareness of deep vein thrombosis among pregnant and postpartum women. The higher risk in pregnant and postpartum women is due to the hormonal changes in women that make the blood clot more easily and affect circulation (Kourlaba et al. 2016).

Study Objectives

The primary and main objective of this study is to assess the awareness of deep vein thrombosis among pregnant and postpartum women in Jazan City, Saudi Arabia. Today, women are at high risk four to five times of developing deep vein thrombosis which can later progress to pulmonary embolism if not treated or prevented during pregnancy, a condition that increases the risk of deep vein thrombosis (Greer 2015). Because of this, this paper looks at the awareness of deep vein thrombosis among pregnant and postpartum women. This would help in reducing the risk of deep vein thrombosis among women during pregnancy.

Research Question

What is the awareness of deep vein thrombosis among pregnant and postpartum women in relation to DVT's signs and symptoms, treatments as well as prevention measures?
The PICO question.
P – Pregnant and postpartum women between November, 2020 and February, 2020
I – No intervention, only awareness assessment.
C – No comparison
O – To assess the awareness level of deep vein thrombosis among pregnant and postpartum women.

Purpose of the Study

The main and primary purpose of this study is to assess the awareness of DVT among pregnant and postpartum women in Jazan city, Saudi Arabia. The statistics on deep vein thrombosis and pulmonary embolism collectively known as venous thromboembolism (VTE) calls up for action towards reducing the risk of developing this disease. This is a worrying statistic because the disease if untreated can progress to pulmonary embolism, one of the most dangerous and feared complications of venous thromboembolism (Greer 2015).

Deep vein thrombosis in the Kingdom of Saudi Arabia (KSA) has been on the rise despite the development and recruitment of health care professionals to handle cases arising from the disease (Holthof 2017). Statistics show that out of the reported cases of death, 18% of the total cases have been associated with venous thrombosis with 6% of the cases arising from deep vein thrombosis and 12% of the cases arising from a pulmonary embolism among pregnant and postpartum women (AL-Hameed 2015).

Looking at these statistics, this study aims at reducing the risk of developing deep vein thrombosis through awareness of deep vein thrombosis among pregnant and postpartum women. This would help in reducing the risk of deep vein thrombosis among women during pregnancy and postpartum.

II.   Literature Review

In coming up with the literature review, I engaged in an extensive research that enabled me to comprehend the topic and the relevant studies conducted pertaining to this condition. Some of the common research materials I used included scholarly and published books by well-known authors, journals, magazines as well as articles. Besides, I did extensive research from the internet where I sourced relevant information pertaining to this condition.

In this review of the literature, Education Resources Information Center (ERIC), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Dublin city university database, Princes Noura University database and Google Scholar databases were accessed, using the key words 'Deep Vein Thrombosis', 'Pulmonary Embolism', 'Awareness', 'pregnant women', and 'postpartum women'. Reports from the World Health Organization (WHO) and the Ministry of Health, Saudi Arabia were also included. This literature search was limited to studies published after the year 2014. More than 15 articles that included quantitative, qualitative and mixed methods research were suitable for inclusion in the literature review (Alsabban and Kitto 2018).

Deep vein thrombosis (DVT) is the development of a blood clot (thrombus) in the body usually in lower extremities such as in the legs, pelvis or thighs. It is one of the leading causes of mortality and morbidity among women, especially during pregnancy. According to the World Health Organization, deep vein thrombosis is a rare condition during pregnancy with 1 in 1000 pregnancies likely of having the condition (Gotlib 2015). However, pregnant and postpartum women are at high risk, meaning they are four to five times at risk of developing deep vein thrombosis. This is compared to non-pregnant women who have a lower risk; for instance, 10% of developing the disease.

Epidemiology of Deep Vein Thrombosis

To date, deep vein thrombosis stands as one of the great health care burdens in the world. Approximately 100 per 100,000 people are affected by the disease yearly (Al-Hameed 2015). Although a significant percentage has been heavily linked to an increase in age, other factors like family history, surgery among others also contribute to the prevalence of this disease (Al-Hameed 2015).

The risk of deep vein thrombosis has been noted to be common in Hispanic and black people unlike in Caucasians. Besides, studies also reveal that deep vein thrombosis prevalence is higher in men than in women despite the vulnerability of both men and women. Age has been highly associated with the development and prevalence of deep vein thrombosis with vascular aging considered as one of the common risk factors of aging in the development of deep vein thrombosis (Yayan and Bals 2016). Also, young people, children in particular have a low capacity of thrombin formation and higher anti-thrombin formation capacity rendering them at low risk of developing deep vein thrombosis. However, pregnancy, use of contraceptives and Cesarean section are linked to the high incidence of deep vein thrombosis (Bonner 2016). These predisposing factors have been known to increase the risk of deep vein thrombosis especially in pregnant and postpartum women. According to Heit (2015), both deep vein thrombosis and pulmonary embolism occur as a stroke and keeps on recurring and therefore must be treated with a lot of care.

Pathway of Deep Vein Thrombosis (DVT) to Pulmonary Embolism (PE)

Pulmonary embolism is triggered by the incidence of deep vein thrombosis. Once in the lower body extremities such as the legs, thighs or pelvis, deep vein thrombosis, if not treated, can lead to pulmonary embolism through a blood clot that travels from the lower extremities into the lungs. The blood clots are also known as a thrombus end up in the lungs thereby blocking the pulmonary artery and capillaries in the lungs. This eventually results in Hypoxemia (Osman et al. 2018).

Although deep vein thrombosis is not a medical emergency, any suspicion of deep vein thrombosis during pregnancy should be taken seriously. Patients need to see a doctor to prevent the progression of pulmonary embolism, the most dangerous and feared complication of venous thromboembolism (Buesing, Mullapudi and Flowers 2015).

Risk Factors

Identifying key and predisposing factors that lead to the incidence and development of deep vein thrombosis is very important to the patient and the hospital as well. This is because it helps the patient and the hospital to understand and appreciate the importance of awareness on matters relating to health such as prevention of deep vein thrombosis among other conditions. This helps in finding out the possible strategies that can be used in reducing the risk of developing the disease, in this case during pregnancy (Liddle and Pennick 2015).

The common risk factors of deep vein thrombosis include orthopedic surgery. This is one of the most key risk factors in the incidence and development of deep vein thrombosis. The condition easily manifests itself in patients with lower limb fractures or those recovering from orthopedic surgery (Comerota and Barayan 2015). Once in the body, the condition affects the walls of the vascular system as well as the immobility system. As a result, a blood clot is created which then creates a barrier to the flow of blood from one part of the body to the other. Besides, the disease has been heavily linked to the activation of pathways for coagulation. Orthopedic surgery is a major risk factor for those women especially in women during pregnancy and postpartum (Rose 2017).

Age is also another important risk factor that can predispose a person to deep vein thrombosis. The risk of developing deep vein thrombosis increases with age and statistics shows that older men and women are likely to develop the condition, unlike children who have high antithrombin capacity and low thrombin formation capacity. It is important to note that as one ages, he or she has a higher risk of developing deep vein thrombosis among other diseases including hypertension. The high development of deep vein thrombosis among pregnant and postpartum women is as result of the hormonal changes. Changes in the hormones of the body especially in older women results in a blood clot which then hinders blood from flowing to other parts of the body. As a result of this, deep vein thrombosis develops (Chung et al. 2014).

Inheritance is another possible risk factor in the development of DVT. In the United Kingdom, approximately 10% of the total population has a V Leiden factor, a genetic condition responsible for rapid blood clotting. A survey conducted has shown that a majority of the population is not aware of the V Leiden factor until they are tested following a blood clot (Parrott, Hong and Greenberg 2015).

Cancer has also been linked to the incidence of deep vein thrombosis in many parts of the world. It is one of the common risk factors of deep vein thrombosis with high incidence rates among patients. However, the clear incidence of deep vein thrombosis varies greatly according to the tumor characteristics. For instance, the extent of the benign or malignant tumor (Oskai et al. 2018). Research has also shown that patients undergoing

treatment for instance chemotherapy treatment are at higher risk of developing deep vein thrombosis. This is because of the hindrance of important activities of proteins S and C (Lee et al. 2020).

The other common risk factors to deep vein thrombosis among pregnant and postpartum women is obesity and Cesarean section. Obese women have high risk of developing deep vein thrombosis. This is because obesity alters the chemical composition of blood leading to inflammation. It makes blood more susceptible to clotting. In addition, obesity puts pregnant and postpartum women at higher risk of diabetes increasing the risk of deep vein thrombosis (Aslam et al. 2017).

The Cesarean section is one of the highest risk factors for deep vein thrombosis in pregnant women with a failed vaginal delivery and required a cesarean section. Majority of pregnant women diagnosed of blood clots related to their pregnancy have shown to develop this condition, deep vein thrombosis (Fatokun et al. 2018).

Apart from the above-mentioned risk factors, smoking also possesses a great risk to the incidence and development of deep vein thrombosis. Tobacco contains harmful substances that when inhaled get into the lungs damaging the important vessels of the lungs the bronchioles and alveoli (Dai 2018). As a result, any blood clot from the lower extremities for instance, from the legs, pelvis or thighs can easily move into the lungs and cause severe damage thereby resulting in pulmonary embolism (Wagealla 2018).

When a patient's for instance, pregnant and postpartum women are predisposed to these risk factors, they are likely to develop deep vein thrombosis and even pulmonary embolism if not treated. Other possible risk factors include oral contraceptives especially in people who smoke, sitting or maintaining one position for a long period, heart failure, long journeys in cars or flights, family history of the disease among pregnant and postpartum women (Mann Hamad and Kumbhare 2018)

Pathogenesis

Pathogenesis of deep vein thrombosis is very important in understanding the incidence, transmission as well as prevention of the disease. Pathogenesis of deep vein thrombosis draws back to the causes of the disease which include venous stagnation, abnormal changes in constituents of blood, injuries on the walls of body vessels among other related factors. Currently, the pathogenesis of deep vein thrombosis is linked to overexpression of endothelial protein C receptor and thrombomodulin (Caplan and Liebeskind 2016). Some studies have heavily linked the pathogenesis of deep vein thrombosis to hormonal changes especially in old people. Besides, it also involves an important down-regulated factor known as the Von Willebrand factor. As a result of this, the rate at which anticoagulation occurs speeds up resulting in the hindrance of important activities of pro coagulation occurring in the venous system (OGWENO 2016)

Major orthopedic surgeries have been known to cause the development of deep vein thrombosis. For orthopedic surgery as a result of fractures, deep vein thrombosis can be contributed to a large extent by the sluggishness of blood flow in the veins. Also, injuries to the endothelium may arise as a result of exposing the acetabulum as well as the femoral canal of the hip (Osman et al. 2018). Deep vein thrombosis resulting from proximal veins has been identified as a serious complication of venous thrombosis embolism that can lead to death if not attended to (Haig et al. 2016).

Diagnosis

Diagnosis of both deep vein thrombosis (DVT) and pulmonary embolism (PE) collectively known as venous thrombosis embolism (VTE) is an important process to the treatment and prevention of the condition because failure to do so can result in a fatal complication, pulmonary embolism. All pregnant and postpartum women suspected of having deep vein thrombosis for instance, from deep vein thrombosis symptoms should go through whole leg compression ultrasonography. This will help in determining the presence of DVT before commencing actual treatment (Mumoli et al. 2017).

The most common and evidence-based method of deep vein thrombosis diagnosis is the comprehension evaluation that involves a combination of disease symptoms, signs and risk factors. The patient's risk of developing deep vein thrombosis is first determined based on the patient's medical history as well as physical examinations. Besides, pre-test probability models can also be used including D-dimer testing (Streiff et al. 2016). Although several scoring systems have been developed to address this issue, the most recommended and commonly used system is the Wells score system. Wells system classifies patients into three groups that include low-probability, moderate-probability, and high-probability based on patient risk factors to deep vein thrombosis, signs, and symptoms.

Other techniques such as the color-Doppler technique are being used in the diagnosis of deep vein thrombosis besides the D-dimer and Wells model. Although these techniques face a lot of criticism, reviews from patients show that they are efficient and effective. This is following their optimal sensitivity for deep vein thrombosis (van Es et al. 2016). Diagnosis of deep vein thrombosis and pulmonary embolism during pregnancy requires a lot of accuracy from the diagnosing equipment such as objective imaging equipment. In addition,

Homan's sign is very useful especially when locating pain in the calf of the legs upon dorsiflexion (Phillips 2018).

Prevention of deep vein thrombosis Among pregnant and postpartum women
Prevention of deep vein thrombosis is the first step to reducing the risk of developing the disease. Most of the risk factors associated with deep vein thrombosis can be clinically prevented. Several preventive methods have been developed and accepted by health care professionals. The most common preventive methods have been classified into three major categories namely general procedures, physical methods and chemical methods (Dobromirski and Cohen 2012). Under general procedures, anesthesia is used by surgeons and anesthetics to enhance the flow of blood and reduce the risk of developing deep vein thrombosis. This method has seen a significant improvement in the prevention of spinal related deep vein thrombosis. Also, mobilization has been highly recommended during the early stages of pregnancy (Allman, Wilson and O'Donnell 2016).
For physical methods, compression stockings can help in reducing the incidence and development of deep vein thrombosis. Well-fitted stockings help in maintaining the body parts for instance, the knees by slowly but graduate compressing the fitted area to reduce the risk of deep vein thrombosis. The chemical methods make use of chemical agents such as pentasaccharide in preventing DVT (Clarke et al. 2016).
Despite the use of the above-mentioned prevention methods for instance, general procedures, physical methods, and chemical methods the incidence and prevalence of deep vein thrombosis are still very high, especially in Saudi Arabia. Because of this, awareness regarding deep vein thrombosis would help prevent and reduce the risk of deep vein thrombosis (DVT) and pulmonary embolism (PE) during pregnancy (Streiff et al. 2014). Prevention of thrombosis demands heightened awareness among participants as well as healthcare practitioners and this heightened awareness can only be achieved through a health education program for pregnant and postpartum women in general (Hull, Rajendran and Barnes 2016).

Treatment
Deep vein thrombosis is a serious and life-threatening condition that can be fatal if not treated. If diagnosed with deep vein thrombosis, immediate treatment should be commenced to reduce the risk of pulmonary embolism, a serious and fatal complication (Osman 2018).
According to Mclintock (2014), treatment of deep vein thrombosis should continue for a minimum duration of 6 months and until at least six weeks postpartum. Pregnant and postpartum women also need to undergo anticoagulation. This is very significant as it helps in preventing valve thrombosis that can risk the mother and the unborn child to deep vein thrombosis and even pulmonary embolism (McLintock 2014). Treatment of deep vein thrombosis during pregnancy has a lot of challenges. The most common and preferred treatment method for deep vein thrombosis during pregnancy is the use of low molecular weight heparin (LMWH). This treatment method has been identified as one of the safest and effective methods unlike other methods like the use of heparin. However, pain, bleeding, and recurrent miscarriage are some of the problems witnessed during the prenatal period (James 2017).

Conceptual Model
Health Belief Model(HBM)
This is one of the most important models used to explain and predict health behavior. Besides, the model plays an important role in understanding the reasons why people engage in behaviors on matters relating to health. The model suggests that people's beliefs, opinions, and approaches to healthy behaviors are dictated by their susceptibility and perceived barriers concerning specific health behavior (Skinner et al 2018).
According to the Health Belief Model (HBM), people are more likely to engage in healthy behaviors if they feel the condition is a threat to their lives (perceived susceptibility). Naturally, people engage in behaviors that add positive value to their health. Understanding the Health Belief Model is of great significance especially to pregnant and postpartum women in reducing the risk of deep vein thrombosis and pulmonary embolism (O'Meara 2018). The model greatly imparts pregnant and postpartum women with knowledge, skills, self-efficacy as well as support in self-understanding and managing diseases like deep vein thrombosis and pulmonary embolism.
Behavior change is motivated by an internal assessment of oneself. When pregnant and postpartum women understand and contemplate the dangers and complications associated with deep vein thrombosis, many tend to appreciate the role of engaging in healthy behaviors like quitting smoking and exercising. This can help them reduce the risk of developing deep vein thrombosis. This change in behavior is probably motivated by an internal assessment of themselves (Kvamme and Costanzo 2015). Although the health belief model has proved working especially in serious conditions, there are some limitations associated with it. For instance, the model does not account for people's beliefs and attitudes on health matters. Besides, the model lacks a clear reference

to both the environment and socio-cultural context where a person can arrive at his or her judgment depending on the susceptibility of the risks.

III. Methodology

The purpose of this study is to assess the awareness of DVT among pregnant and postpartum women in a health care facility in Jazan, Saudi Arabia. Findings from the study can go on to inform the need for an awareness program that can help reduce the risk of deep vein thrombosis especially among pregnant and postpartum women. In view of this, this section is divided into three main sections namely study design, survey instrument and statistical analysis. In addition, the section also addresses ethical consideration in relation to participant's rights and protection pertaining to the study.

Study Design

This is a quantitative study that will be conducted at a health care facility in Jazan City. The study will involve the assessment of awareness of deep vein thrombosis among pregnant and postpartum women. This will be through gathering of quantifiable data and performing computational statistical analysis (Riffe et al. 2019). The study will be conducted using a survey design that will involve the use of a well-constructed questionnaire (*A Questionnaire on the Pregnant and Postpartum Women Knowledge And Awareness of Venous Thromboembolism*) for data collection (*Appendix C*). This is a validated questionnaire from Dr. Hind Al Modaimegh, Associate Dean, College of Pharmacy –Female Branch, King Saud Abdulaziz University for Health Sciences. The questionnaire previously done by Dr. Hind Al Modaimegh was validated by first establishing face validity, a process that involved two different parties reviewing the survey instrument. Secondly, the questionnaire was run as a pilot test with a subset of study participants. Thirdly, clean data was collected from the responses into a spreadsheet. This involved having one person read the values as well as the responses aloud and another person entering them in a spreadsheet. Fourthly, the questionnaire was checked for internal consistency and lastly, the questionnaire was revised based on the information gathered (Lazar et al. 2017). For anyone to use this questionnaire, one has to seek permission from Dr. Hind Al Modaimegh providing solid reasons as to why he or she wants to use the questionnaire which was approved for this study. The new researcher not only has to ask permission but also adhere to the rules and regulations regarding the use of a validated survey instrument. For instance, the new researcher has no permission to edit or change whatever is in the questionnaire. However, he or she is allowed to add his or her information that might be of relevance to the study. In addition, the new researcher needs to acknowledge in writing the manuscript of the source of the survey instrument (Lazar et al. 2017). However, for the purpose of this study the validated questionnaire will not be edited.

For validity, I will ensure that the questionnaire assesses what the study intended to assess. This will be through translation of the questionnaire into Arabic which using a professional translator. Content Arabic speaking experts will revise the questionnaire for accurate translation that will confirm study readability and completeness of the questionnaire (Hall et al. 2018).

The rationale of this design method is its usefulness in quantifying behaviors and attitudes as well as opinions and later a generalizing sample population in relation to the study objectives (Kumar 2019). The design provides a better understanding of the quantities and behaviors under study. Also, the design approach is an efficient means of getting data without necessarily having threats to participants as opposed to other means. In addition, it will also help minimize any biases that might arise (Adams and Lawrence 2018). The study will be conducted at King Fahd Central Hospital in Jazan city. A proposal will be submitted to the hospital ethics committee who are responsible for ensuring participants rights are protected and maintained while conducting research at King Fahd Central Hospital.

Ethical Consideration

Ethical consideration is an important section of any research both quantitative and qualitative. It is through ethical consideration that the dignity and rights of participants are respected and protected. It is very wrong and against human rights when researchers engage in a research study that does not respect the dignity of their participants (McDougal et al. 2018).

In this study, my main focus will be maintaining and upholding the confidentiality of the study. Also, no pregnant and postpartum woman will suffer any health hazard from completing the questionnaire. All the data from the study will only be shared between the researchers and the participants and not to any stranger (Spradley 2016).

All the participants who meet the inclusion criteria will have to sign up a consent form before taking part in the study. This will help minimize the cases arising from ethical rights and considerations. Besides, the informed consent helps in protecting participants' right to autonomy for instance, the right or ability to self-

determination concerning one's plans. By reading and signing the informed consent, participants voluntarily agree to participate in the study knowing the benefits and consequences of the study.

Also, the informed consent form helps in protecting the researchers from any lawsuits from the participants as a result of consequences (Regmi et al 2017). Before conducting this study, participants will be required to go through a clear and concise informed consent (*Appendix A*). Other important ethical issues taken into account for the study include respect for confidentiality and anonymity, and respect for privacy.

The questionnaire will assess the participant's awareness of deep vein thrombosis, its signs and symptoms as well as prevention measures one can use to avoid deep vein thrombosis during pregnancy and postpartum. In addition, the questionnaire will include demographic information that includes gender, age, and marital status among women. The cross-sectional study will be conducted at King Fahd Central Hospital. The selection of participants will be based on sampling from pregnant and postpartum women who have a regular follow up at the hospital, King Fahd Central Hospital or those giving birth at the hospital. Besides, systematic sampling will be used based on participants who meet all the inclusion criteria which are above 18 years old, be conscious particularly after a surgery procedure. Patients under the age of 18 years, critically ill or those with cognitive problems will not be allowed to take part in the study.

The recruitment process will aim at approaching women waiting to be seen and brief them about the research. Besides, the women will also be given the questionnaire to help them understand better as far as the research is concerned. This will help them evaluate themselves and come up with credible information in relation to the study

The inclusion criteria include: women above 18 years of age, pregnant and postpartum inpatients or pregnant and postpartum patients attending pre and post natal clinics. The exclusion criteria are: women under the age of 18 years, non-pregnant women or women past the post-partum period of 6 weeks and women not attending the clinics.

The sample will include pregnant and postpartum women waiting to be seen by an Obstetrician. They will be approached and given the participation information form (PIF) after which they will be given the questionnaire in hard copy form to complete.

Survey Instrument

The study will employ the use of a questionnaire consisting of 22 close-ended questions. This survey instrument will be used in collecting quantitative data as well as other relevant information from the participants.

The first part of the questionnaire deals with demographic information of the patient including the age, weight, education level, number of successful pregnancies, number of abortions (if any), and the reasons for the hospital visit.

The second part of the questionnaire deals with family history and any past medical history of deep vein thrombosis as well as the recommended medication pertaining to the participants. The third and fourth parts of the questionnaire will focus on patients' awareness of deep vein thrombosis and any other reliable and valid sources of deep vein thrombosis the patient can know.

IV.   Data Analysis and Evaluation

Data Analysis

During data analysis, descriptive statistics using a range of univariate and multivariate statistical analyses will be employed to explore the data generated from the questionnaire. In addition, clear and accurate statistics from the participants including information regarding their demographics, number of successful pregnancies, abortions, level of their education, among others will be obtained. Also, data on patient awareness of signs and symptoms of deep vein thrombosis and pulmonary embolism will be calculated and analyzed. Also, knowledge and awareness of risk factors and preventive measures of deep vein thrombosis will be computed.

After a successful computation of the above-mentioned parameters, a clear comparison of deep vein thrombosis and pulmonary embolism awareness with a patient's level of education, number of successful pregnancies, abortions and family history will be carried out using SPSS. This will help in understanding and appreciating the results of the study.

The results of the survey will be carefully analyzed and evaluated to determine the level of knowledge with in relation to deep vein thrombosis among pregnant and postpartum women in Jazan city, Saudi Arabia. Descriptive statistics will be generated based on the 22 questions of the survey instrument. The descriptive statistics will basically include frequency distribution of each design question, mean scores among others.

The obtained mean scores will later be analyzed using the software, Statistical Package for the Social Sciences (SPSS) in relation to the study findings. The rationale of using the SPSS is that the software is easy to use and reliable (Hinton and McMurray 2017). Only statistically significant relationships will be determined based on alpha 0.05 or less.

This will help in determining given changes in respect to time. The rationale of using software is that it allows one to import data from other sources such as excels spreadsheets for data analysis.

Evaluation

Credibility in any study is very important not only to the researcher but also to the target population. It acts as support evidence in delivery practice. In response to this, evaluation of this study is very important not only to the researcher but also to the public. This research will be evaluated based on the study findings. The expected outcome is that a good number of participants will have little or no knowledge about deep vein thrombosis, its incidence, signs, and symptoms as well as prevention measures.

If this is the findings, an educational program can help educate pregnant and postpartum mothers on the risks of deep vein thrombosis, the common signs and symptoms as well as preventive measures that can prevent pregnant and postpartum women from developing deep vein thrombosis and pulmonary embolism (Di Nisio, van Es and Buller 2016).

V. Discussion

Summary of Findings

Deep vein thrombosis is a serious condition that requires immediate attention. Although deep vein thrombosis during pregnancy is a rare condition, the disease can affect any person depending on the risk factors mentioned above. Deep vein thrombosis is a preventable disease as opposed to many. Living a healthy life includes knowing about your health, doing exercise, managing your diet among others can help reduce the risk of developing DVT during pregnancy. According to Bruce Evatt, Chief of the Hematologic Diseases branch at the CDC "We can reduce the risk of its serious and threatening complications if we raise education and awareness among the public and urge all health care providers to institute standards preventive measures (Evatt 2015, P. 335).

The study aims to assess the awareness of deep vein thrombosis among pregnant and postpartum women in finding out the level of awareness among this population. Depending on the study findings, if women are proved to lack awareness of Deep Vein Thrombosis, then an intervention program will be necessary to help minimize this problem. An increase in women's knowledge and awareness of deep vein thrombosis could help promote adherence to non-pharmacological thromboprophylaxis. This would allow women to assess themselves and report any deep vein thrombosis symptoms while in the hospitals and even after hospital discharge. Besides, it will help women especially pregnant and postpartum women in obtaining timely assistance as far as medical attention is concerned (Srivastava et al. 2015).

Limitations

The survey will employ a questionnaire with close-ended-questions. Because of this, the possibility of inflating the result is very high. The respondents are tempted to guess rather than giving genuine answers to the questions as opposed to questions where more than one question is permitted (Fink 2015). However, this could be dealt with by the nature of the disease, its signs and symptoms as well as risk factors of the disease. This could help ensure a piece of solid information as well as knowledge of the respondents concerning the disease.

Conflict of Interest

There will be no potential conflict of interest in this study regarding the research as well as the participants. The researcher will not at all times expected to create any sort of conflicting interest either with herself or with the participants. This will help in ensuring the credibility of the study (Thomas 2017).

Besides, all participants will be given an informed consent form before agreeing to participate in the study. Also, permission to conduct the study will be genuinely obtained from the hospital, King Fahad Central Hospital and from the participants before carrying out the study.

Implications for Practice

It is important to note that findings from this study can be used to effectively and innovatively address the serious conditions apart from deep vein thrombosis such as diabetes, cancer, HIV/AIDS, etc. affecting the world today (Curtis et al. 2017). This is by carefully implementing preventive strategies that can help reduce the incidence and risk of diseases. Results from the study will help provide a clear picture on the awareness of Deep Vein Thrombosis which will then be used to help not only the health care institutions but also the patients in living a free and healthy life.

The findings from the study may serve as the basis for bettering health care not only in Saudi Arabia but also in the whole world.

VI.   Recommendations for Future Research

From the research, it is quite evident that there exists a huge gap in relation to the incidences and prevalence of deep vein thrombosis. Research has also shown that there is a lack of awareness in relation to deep vein thrombosis. The existing gap is that, there are only limited research studies that have been conducted in relation to this condition (Steen et al. 2019). These studies have not clearly dwelt on the awareness of DVT posing a great risk to pregnant and postpartum women. Because of this, there is a high need for scholars and other academicians to engage in research for instance, extensive research that can help the world manage the condition and reduce its prevalence.

VII.   Conclusion

Deep vein thrombosis is a serious condition and one of the leading causes of morbidity as well as mortality especially in pregnant and postpartum women who are at high risk four to five times of developing the condition. This is so alarming not only to Saudi Arabia but to the whole world. It is also important to note that if left untreated, deep vein thrombosis (DVT) can result in pulmonary embolism (PE), a condition known to be one of the most feared complications. Because of this, there is a need to increase and promote the awareness of deep vein thrombosis (DVT) among pregnant and postpartum women. This will help in reducing the incidence and prevalence of the condition among pregnant and postpartum women.

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